



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research / **NIOSH**

Lineman Electrocuted in North Carolina

FACE 86-21

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. By scientifically collecting data from a sample of fatal accidents, it will be possible to identify and rank factors that influence the risk of fatal injuries for selected employees.

On March 23, 1986, at 9:30 a.m. a lineman was electrocuted when he contacted a 7200 volt power line at an electrical substation. The line was assumed to be dead because the substation had been de-energized.

Contacts/Activities:

officials of the Occupational Safety and Health Administration for the State of North Carolina notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. On April 9 and 10, 1986, a DSR research team met with employer representatives, interviewed comparison workers, interviewed the next of kin, conducted a site visit, discussed the incident with the OSHA Compliance Officer, and photographed the accident site. Eye witnesses were interviewed and the county coroner and county police were contacted.

Overview of Employer's Safety Program:

The employer is an electrical co-op that employs 70 people. The employer has an established safety program. A comprehensive safety manual is distributed to each employee. Each new employee undergoes an orientation period and all employees attend yearly training sessions. An employee safety committee meets at least bi-monthly with management personnel to discuss safety issues. The safety program is managed by the operations manager on a collateral-duty basis. This has been the first fatality at the co-op in its 46 year existence.

Synopsis of Events:

At 7: 30 on the Sunday morning of the incident, the operations manager received a call at his residence from the co-op's emergency answering service, alerting him of a major power outage that involved two areas and two substations serviced by the co-op. The operations manager contacted the co-op's standby service crew to obtain the details surrounding the outage. The operations manager was informed that one phase of a bus structure had burned in two and fallen across two phase jumpers at one of the substations. This resulted in the fuses being blown in these outgoing lines and killed the power

at both substations. It was decided by the operations manager and the standby crew to isolate the two substations from each other so that while repair work was being performed on the damaged, de-energized substation, power could be restored to the second substation and to the areas that it serviced. The standby crew replaced the two blown fuses, re-energized the feeder line to the second substation, and then proceeded to the second substation to “bring its circuits back on line.” This would allow power to be restored to all areas being serviced by the second substation. The operations manager then called in a second two man crew to perform the necessary repairs to the damaged substation. The operations manager and the second crew met at the co-op office to obtain all supplies needed for these repairs. A third employee monitored the calls over a scanner and called to volunteer his help. He was told to meet the other men at the substation.

Upon their arrival at the substation, the men surveyed the damage that had been done and identified the supplies that would be needed to complete the repair work. Grounds were placed on the incoming lines of the bus and were connected to the structure. All reclosers were locked in the open position and the bypass switches were opened. Once assured that the work area was protected, the victim (a first class lineman with 26 years of experience) climbed the support column of the substation to a level on the substation structure (approximately 15 feet above ground) where he could work on the bus. The second crew member (a line crew leader) positioned an aerial bucket through the substation structure so that he could work on the bus from the aerial bucket. The operations manager and the third worker remained on the ground to prepare the materials that would be needed to complete the repairs.

At approximately 9:00 a.m. work on the bus was almost complete and the operations manager decided to travel to the undamaged substation to discuss with the standby crew the methods to be used to bring both substations “back on line” as they were before the power outage.

The victim informed the line crew leader in the aerial bucket that his work was completed and that he was going to climb down the substation support structure to help the third worker on the ground clean up the remaining supplies. Rather than climbing down the substation support structure he had utilized at the beginning of the repair job, the victim decided to cross the substation and descend the support structure on the opposite side of the substation. As he began to climb down the support structure, his right leg contacted an ungrounded jumper on what was thought to be an “outgoing” feeder line. The victim provided a path to ground for the current from the jumper to the substation support structure, causing his electrocution. The victim fell approximately 12 feet to the ground. He was pronounced dead at the scene. Later it was determined that the “outgoing” line involved in the incident was actually energized with 7200V of backfeed electrical energy from a third substation on the “line.”

Cause of Death:

The county coroner stated the official cause of death as electrocution.

Recommendations/Discussion:

Recommendation #1: All work areas within substations in proximity to electrical conductors that are to be accessed by workers should be isolated (i.e., grounded and de-energized) and verified to be safe by qualified personnel, and all work should be performed within these protected areas.

Discussion: All conductors in the vicinity of the work area should be visibly grounded and de-energized. Work should not begin in these areas until they are verified as being protected by qualified people at the scene. If uncertainty exists, engineering personnel should be contacted to ensure the safety of all concerned. Employees should be instructed that if they must leave this protected area for any reason extreme caution should be exercised and all conductors should be treated as hot.

Recommendation #2: Employers should identify all safety hazards that might be present at a given job site and provide training to address these hazards.

Discussion: Engineering personnel should perform periodic surveys of substations and identify any safety hazards such as backfeed electrical energy that might be present at a given job site. A record of these hazards should be maintained and workers should be made aware of any hazards they might encounter. Additionally, hazards present at a job site, such as a substation, should be listed on a warning sign and placed in clear view of anyone entering the premises. Although a 1/4 inch strip of labeling tape was present on a leg of the support structure stating that the line was “fed” from another substation, it was very small and ineffective. Training programs should emphasize proper procedures for performing work at electrical substations and also the hazards associated with these substations. Training programs should include basic electrical theory sessions that address electrical substations including the identification, evaluation, and control of the hazards associated with work at these substations. Because of the ever present danger of feedback electrical energy, the proper method of de-energizing and protecting a work area within a substation should be stressed.

Recommendation #3: Employers should assure strict adherence to existing safety rules.

Discussion: Employer safety rules state that a qualified “checker” be appointed by the supervisor to oversee an employee who is performing work in an area where the hazard of contact with an energized conductor exists. This “checker” would be thoroughly instructed and familiarized with specific, existing safety hazards and would assure that the workers would remain in their protected work area. Had the victim stayed in his protected work area and descended the substation support structure that he had used to access the work area, the incident would have been prevented.

[Return to In-house FACE reports](#)

Last Reviewed: November 18, 2015

How helpful was this page?



Not helpful

Very helpful